

Reverse Kleiner method for manufacturing nitrogen dioxide,nitric oxide,nitric acid,metallic ascorbates and alkyl ascorbates of vitamin C

ABSTRACT

In this invention new chemical reactions,new chemical processes are established,and these chemical reactions and chemical processes can be used with the system designed to produce nitrogen dioxide,nitric oxide,nitric acid as well as metallic ascorbates or alkyl ascorbates,either as main or as secondary products.

Ascorbic acid solution is reacted at room temperature or at elevated temperature with either sodium nitrite or potassium nitrite or calcium nitrite or alkyl nitrite such as isobutyl nitrite or barium nitrite or silver nitrite solution. All the second reactants except alkyl nitrites such as isoamyl nitrite or isopropyl nitrite or isobutyl nitrite, as well as the first reactant,ascorbic acid, are in aqueous solutions.The reaction vessel contains the ascorbic acid solution;into this solution,under, certain pressure, is delivered the choosen aqueous nitrite solution.Gas mixture of nitrogen dioxide and nitric oxide is produced by addition of the choosen nitrite solution. The generated and collected gas mixture is then mixed with oxygen,thus the nitric oxide in the gas mixture converts - by reacting with oxygen - into nitrogen dioxide,then this homogeneous gas is dissolved in water,thus giving us nitric acid.In this chemical reaction system two sets of chemical reactions take place;one on the surface of the solution(s) that produces the main part of the gas mixture,and this is the major part of the chemical reaction system. In the liquid phase of the reaction processes form the metallic ascorbates as well as the alkyl ascorbates. All the same can be done with isoascorbic acid;the chemical reactions will go somewhat slower.